

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:

HIROSHI URABE ET AL

SERIAL NO. 09/870,716

GROUP ART UNIT: 1711

EXAMINER: NATHAN M. NUTTER

FOR: THERMOPLASTIC RESIN COMPOSITION

DECLARATION UNDER 37 C.F.R. 1.132

HONORABLE COMMISSIONER OF PATENTS & TRADEMARKS

WASHINGTON, D.C. 20231

SIR:

Now comes Masami SUZUKI, a citizen of Japan, and a resident of c/o Mitsubishi Engineering-Plastics Corporation, Technical Center, 6-2, Higashi-Yahata 5-chome, Hiratsuka-shi, Kanagawa-ken, Japan, who declares and says that:

1. I graduated from Tokyo Metropolitan College of Aeronautical Engineering, Department of Mechanical Engineering, in March, 1992.

2. I was an employee of Mitsubishi Kasei Corporation 1992-1994 and have been an employee of Mitsubishi

Engineering-Plastics Corporation since 1994 and have been engaged in the study of a thermoplastic resin.

3. I am one of inventors of U.S. Patent Application, Serial No. 09/870,716.

4. I have read the Office Action dated July 10, 2006, have understood the Examiner's rejection of the invention claimed in the above application. Then, under my control, the following Experiments were carried out.

Experiment 1 corresponding to Example 1 of EP 0945478

(Nakacho et al.):

Example 1 of EP 0945478 was conducted as follows.

A flame-retardant resin composition was prepared by adding 15 parts of Compound A prepared in Synthesis Example 1 of EP 0945478 (phenoxy-phosphazene compound having paraphenylene-crosslinked structure and equal to the compound produced in Synthesis Example 2 of the present invention) and 0.2 parts of PTFE to a resin comprising 75 parts of an aromatic polycarbonate resin (PC) and 25 parts of ABS resin, mixing the components in a mixer, and melting and kneeding the mixture at a cylinder temperature of 270°C using a twin-screw extruder ("TEX30HCT" manufactured by Nippon Seikosho Co., Ltd.), thereby producing resin pellets.

The thus obtained pellets were dried under reduced pressure at 120°C for 8 hours, and then injection-molded at a cylinder temperature of 270°C using an injection-molding machine ("J75ED" manufactured by Nippon Seikosho Co., Ltd.), thereby producing test specimens.

Notes:

(i) In EP 0945478, there are no descriptions for the materials of aromatic polycarbonate resin, ABS resin and PTFE. Therefore, the following usual commercial products were used.

•Aromatic polycarbonate resin: IUPILON® S2000 produced by Mitsubishi Engineering-Plastics Corporation (viscosity-average molecular weight: 25,000)

•ABS resin: SANTAC® AT-08 manufactured by Nippon A&L Inc.

•PTFE: DYNEON TF1750 produced by Sumitomo 3M Limited.

These materials are usual commercial product and skilled person in the art usually uses these materials, we believe.

(ii) In EP 0945478, melting and kneeding the mixture were conducted by means of a laboplasto mill. However, by this equipment, only 50 to 100g of sample can be obtained and cannot be applied to practical use because the required amount for the evaluation of resin pellet are 3 to 5 kg.

Therefore, in all Experiments, melting and kneeding the

mixture was conducted by usual manner for skilled person in the art using a commercial twin-screw extruder. This is usual manner for skilled person in the art when practicing the follow-up test based on the description of EP 0945478, we believe.

Experiment 2:

The same procedure as defined in Experiment 1 was conducted except for no use of PTFE, thereby producing resin pellets and test specimens.

Experiment 3 corresponding to Example 56 of EP 0945478

(Nakacho et al.):

Example 56 of EP 0945478 was conducted as follows.

A flame-retardant resin composition was prepared by adding 10 parts of the cyanophenoxy group-containing phosphazene compound prepared in line with the description of Synthesis Example 15 of EP 0945478 to 100 parts of nylon-6 having a number average molecular weight of 25,000, mixing the components in a mixer, and melting and kneeding the mixture at a cylinder temperature of 270°C using a twin-screw extruder ("TEX30HCT" manufactured by Nippon Seikosho Co., Ltd.), thereby producing resin pellets.

The thus obtained pellets were dried under reduced pressure at 120°C for 8 hours, and then injection-molded at

a cylinder temperature of 270°C using an injection-molding machine ("J75ED" manufactured by Nippon Seikosho Co., Ltd.), thereby producing test specimens.

Experiment 4:

The same procedure as defined in Experiment 3 was conducted except for further use of 0.2 parts of PTFE, thereby producing resin pellets and test specimens.

Experiment 5:

The same procedures as defined in Experiment 3 was conducted except that a modified polyphenylene ether-based resin (UPIACE® PME50 produced by Mitsubishi Engineering-Plastics Corporation; rubber-containing acid-modified PPE) was further added thereto in an amount of 67% by weight of the cyanophenoxy group-containing phosphazene compound to prepare a flame-retardant polyamide resin pellet and test specimen (namely, no use of PTFE).

Experiment 6:

The same procedures as defined in Experiment 3 was conducted except that a modified polyphenylene ether-based resin (UPIACE® PME50 produced by Mitsubishi Engineering-Plastics Corporation; rubber-containing acid-modified PPE) was further added thereto in an amount of 67% by weight of

the cyanophenoxy group-containing phosphazene compound and 0.2 part of PTFE was also added to prepare a flame-retardant polyamide resin pellet and test specimen (namely use of 0.2 parts of PTFE).

The thus obtained pellets and test specimens were tested to evaluate the bleed-out of flame retarder and mold deposits according the following method.

The obtained dry pellets were examined by hand feeling and observed visually. Further, the mold after injection-molding was visually observed to determine whether or not any flame retarder was adhered to the surface thereof. The evaluation results were classified into the following two ranks:

Poor : Bleed-out and mold deposits were observed,

Good : No bleed-out and mold deposits were observed.

The results are shown in the following Table 1.

Table 1

Experiment No.	1	2	3	4	5	6
Composition (weight parts)						
Nylon-6	-	-	100	100	100	100
PPE (wt% of phosphazene compound)	-	-	-	-	67%	67%
PC	75	75	-	-	-	-
ABS	25	25	-	-	-	-
Phosphazene compound	15	15	10	10	10	10
PTFE	0.2	-	-	0.2	-	0.2
Bleed-out of phosphazene Compound and mold deposits	Good	Good	Poor	Poor	Good	Good

Remarks

Experiment 1 corresponds to Example 1 of EP 0945478 (use of PTFE) and as the material resin, PC and ABS were used. In Experiment 2, PTFE was not used in Experiment 1 (=Example 1 of EP 0945478). Experiment 3 corresponds to Example 56 of EP 0945478 (no use of PTFE) and as the material resin, nylon-6 was used (no use of PTFE). In Experiment 4, PTFE was not used in Experiment 3 (=Example 56 of EP 0945478). In Experiments 5 (no use of PTFE) and 6 (use of PTFE), PPE which is the "phosphazene compatibility enhancing resin" according to the present invention was used (namely, within the scope of the present invention) in addition of compositions of Experiments 3 and 4.

As seen from Table 1, in Experiments 1 and 2, bleed-out and mold deposits of phosphazene compound were not observed. Namely, in the composition composed of PC, ABS and phosphazene compound with or without PTFE, there is no problem in the bleed-out and mold deposits of phosphazene compound.

On the other hand, in Experiments 3 and 4, bleed-out and mold deposits of phosphazene compound were observed. Namely, in the composition composed of polyamide (nylon-6) and phosphazene compound with or without PTFE, there is a problem in the bleed-out and mold deposits of phosphazene compound.

It is clearly understood that the bleed-out and mold deposits of phosphazene compound is different in the combination of material resin and phosphazene compound. Namely, in case of the composition of PC, ABS and phosphazene compound with or without PTFE, there is no problem in the bleed-out and mold deposits of phosphazene compound, however, in case of the composition of polyamide and phosphazene compound with or without PTFE, there is a problem in the bleed-out and mold deposits of phosphazene compound (there is no difference in whether containing PTFE).

On the other hand in Experiments 5 to 6 (within the scope of the present invention), bleed-out and mold deposits of phosphazene compound were not observed (there is no difference in whether containing PTFE).

Therefore, it is clearly effective for preventing from bleed-out and mold deposits of phosphazene compound to add the phosphazene compatibility enhancing resin to the polyamide resin composition.

5. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

6. Further, deponent saith not.

Date: Feburary, 27, 2007

Masami Suzuki
Masami SUZUKI